ATTACHED ARE:

1) A transcribed copy of BAA 01-26 as it appeared in the *Commerce Business Daily* (CBD) of February 8, 2001 and

2) the BAA 01-26 Proposer Information Pamphlet.

Due to the possibility of transcription errors, the official CBD announcement takes precedence over this transcription in any disagreement between the two. The transcription is provided for your convenience only.

ADMINISTRATIVE NOTE:
NEW REQUIREMENTS/PROCEDURES

BIO-COMPUTATION (BIO-COMP), SOL BAA 01-26, DUE: 05/03/01; POC: DR. SRI KUMAR, DARPA/ITO; FAX: (703) 522-7161

PROGRAM GOALS

The Bio-Computation program is aimed at exploring and developing computational methods and models at the bio-molecular and cellular levels. The program is directed towards achieving both powerful, synthetic computations that can be implemented in bio-substrates, as well as modeling and analytical tools for prediction and control of cellular internal processes and systems of living cells, for application in a variety of contexts of interest to DOD.

Specifically, the program goals are twofold. First, the program aims to develop scalable DNA and related nucleotide manipulation techniques for realizing powerful computational methods for solving highly complex problems, for designing ultra-high density information storage, and for developing programmable nano-structures of nucleotides for novel applications. Second, the program aims to develop computational models, techniques, and tools, for in-silico analysis, capable of predicting cellular processes and their spatio-temporal behavior, which can also assist in developing control strategies. These include rapid prediction of the impact of external agents and environmental factors, and quick identification of targets and design of intervention mechanisms. Additionally, the program aims to validate and demonstrate the effectiveness of these models through experimentation, such as those directed towards highly conserved mechanisms, potentially of high payoff to DOD.

Research and development is sought in the following two technical areas:

I. DNA Computing
II. Computational Models and Simulation of Intra-Cellular Processes and Systems.

These areas are described next. Interested proposers must obtain and respond to ALL requirements in the Bio-Comp Proposer Information Pamphlet (PIP), available at:

http://www.darpa.mil/ito/Solicitations/PIP_01-26.html

I. DNA COMPUTING

This technical area seeks research in innovative techniques and systems for performing computation in bio-substrates. The specific focus is on methods of representing information in DNA fragments, and related nucleotides, and using nucleotide manipulation techniques to perform arbitrary and powerful computations. The program seeks techniques that can be viable and scalable mechanisms for DOD applications. Such applications include: i) solution of complex computational problems, ii) ultra-high density content addressable storage, and iii) programmable and self-assembled nano-structures of DNA useful in applications such as improved crystallography and molecular electronics layout. Topics of particular interest are:

1. Scalable DNA Computing
2. Compact, content addressable storage
3. Programmable, self-assembled 2-D and 3-D DNA nano-structures
4. Implementing computational elements and circuits that use in-vitro transcription and/or translation, and application demonstrations
5. Other related ideas with revolutionary promise

II. COMPUTATIONAL MODELS AND SIMULATION OF INTRA-CELLULAR PROCESSES AND SYSTEMS

In this BAA technical area, DARPA seeks research on powerful computational models of intra-cellular processes and systems as a basis for predicting and controlling the spatio-temporal cellular behavior. Based on these models, DARPA seeks open source development of an in-silico cellular analysis and evaluation tool, Bio-SPICE, a Simulation Program for Intra-Cell Evaluation. Bio-SPICE is intended be a user-friendly simulation tool, with embedded models and techniques that effectively capture the processes governed by the network of molecular interactions including gene-gene, gene-protein, and protein-protein interactions, and can be customized for use in a variety of applications. These applications include the design of well informed and high success rate experiments, discovery of functional modules in cellular systems, and rapid and precise identification of targets and design of intervention methods. Additionally, model refinement and validation, through cell experimentations are sought. The experimentation realm includes characterization, prediction, and control of highly conserved mechanisms of interest to DOD. These include, but are not limited to, mechanisms related to pathogenic processes, their prediction and control; mechanisms that enable powerful computing methods that mimic natural in-vivo computation; and circadian rhythms, the control over which may lead to enhanced war fighter performance in stressed conditions.

The program seeks to develop Bio-SPICE, in an open source framework. The approach is to develop a model library or a kernel of relevant biochemical processes and analytical tools. This kernel will be integrated into a simulation environment that provides the necessary links to relevant databases. Additionally, user interface and data visualization tools that facilitate easy

use by experimenters will be developed. The models will be tested, refined, and validated using experiments on conserved mechanisms.

Research is sought on the following four topic areas:

1. Model Kernel
2. Experimental Validation
3. Simulation Environment
4. Software Integration

PROGRAM SCOPE

DARPA anticipates the Bio-Comp program to be five years in duration. Proposals for all areas and topics, except the integration task, should have duration of no more than 36 months of base funding, and may include additional one or two year options. Proposals on integration can range from 36 to 60 months, with options, but cannot exceed 60 months. Cost sharing, as well as sharing of data and other relevant intellectual property, is encouraged. Proposals may involve other research groups or industrial cooperation.

Proposed research should investigate innovative approaches and techniques that lead to or enable revolutionary advances in the state-of-the-art. Proposals are not limited to the specific strategies listed above, and alternative visions will be considered. Specifically excluded is research that primarily results in evolutionary improvement to the existing state of practice or focuses on a specific system or solution.

PROPOSER INFORMATION AND TEAM FORMING MEETING

DARPA will hold a proposer information meeting on Bio-Computation. This meeting is also intended to facilitate team forming, in addition to the team forming web site indicated in the next section. This meeting will be held March 1, 2001, at the Greenbelt Marriott Hotel in Greenbelt, MD. Attendance at this meeting is OPTIONAL, but is recommended for potential bidders. Access the Bio-Comp website for the meeting details including registration at:

http://www.dsic-web.net/ito/meetings/biocomp2001feb/index.html

TEAM FORMING WEB SITE

The formation of multi-disciplinary teams consisting of complementary areas of expertise is strongly encouraged. Teams may include experts from any type of organization. An interactive web site is established at the following URL where capability statements from those seeking teams can be posted:

http://www.dsic-web.net/ito/solicitations/biocomp/teaming/login.html

This site will remain active until May 3, 2001. Specific information content, communications, networking, and team formation are the sole responsibilities of the participants. Neither DARPA nor DoD endorses the destination web site or the information and organizations contained therein, nor does DARPA or DoD exercise any responsibility at the destination.

GENERAL INFORMATION

The Defense Advanced Research Projects Agency/Information Technology Office (DARPA/ITO) requires completion of a **Broad Agency Announcement (BAA) Cover Sheet Submission** for each Proposal, by accessing the URL below:

http://www.dyncorp-is.com/BAA/index.asp?BAAid=01-26

After finalizing the **BAA Cover Sheet Submission**, the proposer must submit the **BAA Confirmation Sheet** that will automatically appear on the web page. Each proposer is responsible for printing the BAA Confirmation Sheet and submitting it attached to the "original" and each designated number of copies. The Confirmation Sheet should be the first page of your Proposal. Failure to comply with these submission procedures may result in the submission not being evaluated.

Detailed information and instructions are outlined within the Proposer Information Pamphlet (PIP).

ABSTRACT FORMAT

Revised!

To minimize unnecessary effort in proposal preparation, proposers are strongly encouraged to submit brief proposal abstracts in advance of full proposals. An original and **4** copies of the proposal abstract and **6** electronic copies (i.e., **6** separate disks) of the abstract (in Microsoft Word '97 for IBM-compatible, **PDF, Postscript, or** ASCII format on one 3.5-inch floppy disk or one 100 MB Iomega Zip disk). Each disk must be clearly labeled with BAA 01-26, proposer organization, proposal title (short title recommended) and Copy _____ of **6**. The proposal abstract (original and designated number of hard and electronic copies) must be submitted to DARPA/ITO, ATTN: BAA 01-26, 3701 N. Fairfax Drive, Arlington, VA 22203-1714, in time to reach DARPA by 4:00 PM (ET) **Thursday, March 22, 2001**, to guarantee review. Upon review, DARPA will make a recommendation to offerors either encouraging or discouraging submission of full proposals.

PROPOSAL FORMAT

Revised!

Proposers must submit an original and **4** copies of the full proposal and **10** electronic copies (i.e., **10** separate disks) of the full proposal (in Microsoft Word '97 for IBM-compatible, **PDF, Postscript, or** ASCII format on one 3.5-inch floppy disk or one 100 MB Iomega Zip disk). Each disk must be clearly labeled with BAA 01-26, proposer organization, proposal title (short title recommended) and Copy _____ of **10**. The full proposal (original and designated number of hard and electronic copies) must be submitted in time to reach DARPA by 4:00 PM (ET)

Thursday, May 3, 2001, in order to be considered. Proposers must obtain the BAA 01-26 Proposer Information Pamphlet (PIP), which provides further information on the areas of interest, submission, evaluation, funding processes, proposal abstracts, and full proposal formats. This pamphlet may be obtained by fax, electronic mail, mail request to the administrative contact address given below, or at URL address:

http://www.darpa.mil/ito/Solicitations.html

Proposals not meeting the format described in the pamphlet may not be reviewed. This Commerce Business Daily (CBD) notice, in conjunction with the BAA 01-26 PIP and all references, constitutes the total BAA. No additional information is available, nor will a formal RFP or other solicitation regarding this announcement be issued. Requests for same will be disregarded.

The Government reserves the right to select for award all, some, or none of the proposals received.

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals. However, no portion of this BAA will be set aside for HBCU and MI participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

Evaluation of proposals will be accomplished through a scientific review of each proposal, using the following criteria which are explained in detail in the PIP and listed below in descending order of relative importance:

(1) Overall Scientific and Technical Merit.

(2) Innovative Technical Solution to the Problem.

(3) Potential Contribution and Relevance to DARPA Mission.

(4) Offeror's Capabilities and Related Experience.

(5) Plans and Capability to Accomplish Technology Transition.

(6) Cost Realism.

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a proposal abstract or proposal to this BAA, must be received at one of the administrative addresses below by 4:00 PM (ET) **Thursday, April 26, 2001**; e-mail or fax is preferred. DARPA intends to use electronic mail and fax for some of the correspondence regarding BAA 01-26. Proposals and proposal abstracts **MUST NOT** be submitted by fax **or e-mail**; any so sent will be disregarded.

The administrative addresses for this BAA are:

Fax: 703-522-7161 Addressed to: DARPA/ITO, BAA 01-26
Electronic Mail: baa01-26@darpa.mil
Electronic File Retrieval: http://www.darpa.mil/ito/Solicitations.html

Mail to: DARPA/ITO
ATTN: BAA 01-26
3701 N. Fairfax Drive
Arlington, VA 22203-1714

ADMINISTRATIVE NOTE:
NEW REQUIREMENTS/PROCEDURES

==========

BAA 01-26 PROPOSER INFORMATION PAMPHLET

==========

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first in the *Commerce Business Daily (CBD)*, published by the U.S. Government, Department of Commerce. The following information is for those wishing to respond to the Broad Agency Announcement.

BIO-COMPUTATION (BIO-COMP), SOL BAA 01-26, DUE: 05/03/01; POC: DR. SRI KUMAR, DARPA/ITO; FAX: (703) 522-7161

PROGRAM GOALS

The Bio-Computation program is aimed at exploring and developing computational methods and models at the bio-molecular and cellular levels. The program is directed towards achieving both powerful, synthetic computations that can be implemented in bio-substrates, as well as modeling and analytical tools for prediction and control of cellular internal processes and systems of living cells, for application in a variety of contexts of interest to DOD.

Specifically, the program goals are twofold. First, the program aims to develop scalable DNA and related nucleotide manipulation techniques for realizing powerful computational methods for solving highly complex problems, for designing ultra-high density information storage, and for developing programmable nano-structures of nucleotides for novel applications. Second, the program aims to develop computational models, techniques, and tools, for in-silico analysis, capable of predicting cellular processes and their spatio-temporal behavior, which can also assist in developing control strategies. These include rapid prediction of the impact of external agents and environmental factors, and quick identification of targets and design of intervention mechanisms. Additionally, the program aims to validate and demonstrate the effectiveness of these models through experimentation, such as those directed towards highly conserved mechanisms, potentially of high payoff to DOD.

This Proposer Information Pamphlet describes the research and development sought in the following two topic areas:

III. DNA Computing
IV. Computational Models and Simulation of Intra-Cellular Processes and Systems.

I. DNA COMPUTING

This technical area seeks research in exploring and developing techniques and systems for performing novel ways of computation in bio-substrates. The specific focus is on methods of representing information in DNA fragments, and related nucleotides, and using nucleotide manipulation techniques to perform arbitrary and powerful computations. The program aims to create and demonstrate techniques that can potentially be viable and scalable mechanisms useful in a variety of DOD relevant applications. Such applications include: i) solution of complex computational problems, ii) ultra-high density, content addressable storage, and iii) programmable and self-assembled nano-structures of DNA useful in applications such as improved crystallography, and molecular electronics layout. The following topics are of particular interest to this technical area; however, all other ideas that have revolutionary promise are encouraged for submission. Proposals may address one or more of these topics. The topic areas are:

1. Scalable DNA Computing
2. Compact, content addressable storage
3. Programmable, self-assembled 2-D and 3-D DNA nano-structures
4. Implementing computational elements and circuits that use in-vitro transcription and/or translation, and application demonstrations
5. Other related ideas with revolutionary promise

First, research is sought on methods for scalable DNA based computing, and related nucleotide manipulations, which exploit massive parallelism, as mechanisms for solving complex computational problems. While research accomplishments to date have focused on toy problems, such as six to ten variable satisfiability (SAT) problems, the emphasis of this BAA is on methods that make dramatic improvements over the state-of-the-art. These include development of scalable and viable strategies to code information in DNA strands. Scaling methods may also include techniques for automation of manual tasks such as those that use micro-fluidic devices or automated analysis of micro-array data; however, proposals that address only such automation technology, without regard to scaling methods for DNA computing will not be considered. Of particular interest are surfaced based computing methods that address manipulation of information coded and arrayed on DNA chips. Proposals suggesting in-solution methods will also be considered, but the advantages of the proposed approach must be clearly identified and argued.

Second, research is sought in designing content-addressable wet databases of information objects encoded using nucleotide sequences. This includes tagged DNA systems, where natural DNA fragments are linked with tags that contain the attributes of the natural fragments coded in synthetic nucleotide sequences. Of particular interest are surface based methods for systems with high-throughput input-output, and error-resilient, operations. Proposals on this topic must clearly outline the approach, present evidence of its promise, and describe plans and milestones for prototype development that demonstrates scalable storage.

Third, research is solicited for the design of programmable, self-assembled DNA tiled nano-structures. Particular interest is in techniques that can generate a broad class of stable structures, in two and three dimensions. Proposed methods should aim to achieve the required generality to

produce any desired periodic and non-periodic patterns of features with sizes of tens of nanometers. Proposals should have a clear plan for demonstrating the techniques for novel applications such as layout for molecular electronic devices and quantum dots, and for developing reliable crystals for use in crystallography and protein structure determination.

Fourth, research is also sought in implementing computational elements and circuits that use in-vitro DNA transcription and/or translation, in addition to other operations such as ligation, restriction, and hybridization. Of interest are construction of elements such as controllable switches based on specified DNA transcription units, logic gates, and circuits interconnecting such elements. Proposers should clearly outline the design approach, and aim to demonstrate them in innovative applications. Examples of such demonstrations include, but are not limited to, implementation of neural network algorithms; implementations of genetic algorithms that emulate algorithm steps including the coding of candidate solutions for a given problem, and iterative evolution and selection of candidates based on a fitting criterion; and applications of circuits, so designed, to interface with, and control, in-vivo processes.

Finally, DARPA encourages proposals on other ideas, not listed above, having revolutionary promise that can make significant advances toward program goals.

Proposals must clearly outline the innovative ideas and the approach, identify the evidence for its success, and describe plans for experimental milestones and prototype demonstrations. Proposals from inter-disciplinary teams of computer scientists, biochemists, chemists, engineers, and researchers from other relevant disciplines are strongly encouraged. When proposed experiments involve long synthetic DNA fragments, 200 bases or longer, they must be separately identified in the proposal, along with a description of how such fragments will be acquired, and the estimated cost of such fragments per base, for all needed concentration levels.

II. COMPUTATIONAL MODELS AND SIMULATION OF INTRA-CELLULAR PROCESSES AND SYSTEMS

In this BAA technical area, DARPA seeks research on powerful computational models of intra-cellular processes and systems that can be a basis for predicting and controlling the spatio-temporal cellular behavior. Based on these models, DARPA seeks open source development of an in-silico cellular analysis and evaluation tool, Bio-SPICE, a Simulation Program for Intra-Cell Evaluation. It is intended that Bio-SPICE will be a user-friendly simulation tool, with embedded models and techniques that effectively capture the processes governed by the network of molecular interactions including gene-gene, gene-protein, and protein-protein interactions, and can be customized for use in a variety of applications. These applications include the design of well informed and high success rate experiments, discovery of functional modules in cellular systems, and rapid and precise identification of targets and design of intervention methods that influence cellular dynamics. Additionally, the program seeks to refine and validate the models, as well as demonstrate the effectiveness of Bio-SPICE, through cell experimentations, which are of a high DOD significance. The experimentation realm includes characterization, prediction, and control of highly conserved mechanisms of interest to DOD. These include, but are not limited to, mechanisms related to pathogenic processes, their prediction and control; mechanisms that enable discovering powerful computing methods that mimic natural in-vivo computation;

mechanisms such as circadian rhythms, the control over which may lead to war fighter effectiveness and well-being in stressed conditions.

The program seeks to develop Bio-SPICE, in an open source framework. The approach is to develop a model library or a kernel of relevant biochemical processes and analytical tools. This kernel will be integrated into a simulation environment that provides the necessary links to relevant databases including public databases of genomic and protein interaction information. Additionally, user interface and data visualization tools that facilitate easy use by experimenters will also be developed. The models will be tested, refined, and validated using a range of cell experiments on conserved mechanisms.

Research efforts are sought on the following four topic areas:

1. Model Kernel
2. Experimental Validation
3. Simulation Environment
4. Software Integration

Teaming Desirability and Awards: Proposals may address one or more of the above topics. However, it is strongly desired that proposers address topic 1 and 2 together by synergistically combining modeling and experimental efforts, through effective interdisciplinary teams of biologists, computer and control scientists, chemists and biochemists, and experts from other relevant disciplines. Proposals on all topics must have teams with interdisciplinary skills to effectively interact with other performers in the program. Multiple awards are anticipated in topics 1 and 2. It is expected that topic 3 will have one or two team awards. A single award is expected for topic 4.

Each proposal must clearly identify the topic addressed.

A brief description of each topic is given below.

Topic 1: Model Kernel: Research is sought on powerful computational models and software, that can effectively capture the spatio-temporal nature of the intra-cellular processes, the non-linear feedback nature of interactions, the effect of analog and discrete interactions, asynchronous and stochastic interactions, and the effects of small molecular concentrations. Additionally, the ability to model at multiple time and size scales, and at multiple levels of granularity is important.

Models of highly conserved mechanisms are of interest, as they may serve as building blocks for larger systems that determine cell dynamics and behavior. Conserved mechanisms, whose presence indicates a well-defined function, are found across a number of different organisms. It is intended that models be modular capturing different levels of complexity, from elementary mechanisms such as futile cycles (involving few proteins), to gene expression, and to more complex compound mechanisms (involving multiple genes and proteins).

Modeling scope: The scope of model development for Bio-SPICE will cover mass action reaction kinetic models (including Michaelis-Menten models) for gene-protein and protein-protein reactions; models for small concentrations (such as chemical master equation approach); stochastic and deterministic reaction-diffusion models, molecular transport models; hybrid models of analog, discrete and asynchronous processes; and all other relevant models to capture spatio-temporal effects of cellular dynamics.

Multi-scale, multi-resolution models: Research is also sought on the theory and development of reduced order aggregate models to facilitate multi-scale, multi-resolution analysis. Approaches that scale to handle large number of interactions are desired. Techniques for multiple time scales may leverage methods such as singular perturbation from nonlinear systems engineering. The models should be suitable for prediction, capturing relevant properties such as robustness and adaptation.

Analytical tools: Finally, work is also sought in developing software that provides analytical methods for model development and data analysis. These include a) bifurcation analysis of nonlinear systems, b) a set of conceptual models and system identification techniques for higher-level phenomenological modeling, c) software for Boolean or logical static-analysis of gene-protein circuits to determine potential interactions, and d) tools for data analysis that deal with uncertainties present in cell experiment data; and e) and all other relevant tools.

Delivery of software based on the models proposed should be clearly specified in the proposal, along with the delivery schedule. Proposers must be ready to revise the models and software based on evaluations from the researcher community. Proposal must clearly identify the scope of proposed work, the technical approach, and the benefits of the approach over other alternatives.

Topic 2: Experimental Validation: The objectives of this topic are: a) to experimentally demonstrate the effectiveness of Bio-SPICE in applications of interest to DOD indicated below; and b) through the cell experiments, make significant advancements in prediction and control capability in these application contexts.

Experimental investigation and model validation on broadly conserved higher-level mechanisms are sought. Suggested list of experiments on conserved mechanisms include, but are not limited to, in-vivo DNA editing mechanisms, circadian rhythms, bacterial sporulation and germination, pathogen-host cell adhesion and interaction including bacterial piliation, secretion, chemotaxis, asymmetric division, and cell cycle.

In all cases, experiments must be related to DOD applications such as prediction and control of pathogenic processes including identification of targets, design of cell based sensors, discovering powerful computing methods that mimic natural in-vivo computation, and control over processes such as rhythms that could lead to war fighter effectiveness and well-being in stressed conditions. Specifically excluded in this solicitation, are experiments involving animal and human subjects.

Proposers may choose the organism and cell type for experimental work, but the relevance to the program goals should be clearly identified. Proposals must clearly outline the innovative ideas

and the approach, identify the evidence for its success, and describe plans for experimental milestones and prototype demonstrations, if any. Proposals from inter-disciplinary teams of biologists, computer scientists, biochemists, engineers, and researchers from other relevant disciplines are strongly encouraged. When proposed experiments involve long DNA fragments, 200 bases or longer, they must be separately identified in the proposal, along with a description of how such fragments will be acquired, and the cost of such fragments per base, for all needed concentrations.

Topic 3: Simulation Environment: The objective of this topic is to develop an operating environment for simulation execution of Bio-SPICE. The simulation should be easily configurable, fast, and provide dynamic query and linking capability to all relevant databases, and the modeling kernel.

Research and software development is sought in the following categories: a) Innovative parallel simulation of a gene-protein network, to speed up execution on a parallel processing system; b) Design and development of software for querying, searching, and accessing databases, in a distributed environment; c) Development of effective graphical user interface tools and data visualization techniques; d) Development of a high-level programming methodology and tools to support easily programmable simulation; and e) a common operating environment that manages these components and the model kernel during simulation. The ability to execute simulation on widely used computing platforms, such as Unix, Linux, and Windows NT, is desired. Environment supporting distributed simulation capability is also desired.

It is desired that proposers for this topic address all of the above categories. Proposals should clearly describe the approach and its advantages over alternatives. Awardees should be willing to work with other program performers in tailoring the software to the architecture and the database structure to be developed in the first year of the program.

Topic 4: Software Integration: The role of integration is important in the development of Bio-SPICE. The objectives of the integration task are: a) to develop a software architecture and APIs for the development of Bio-SPICE; b) to integrate all relevant software components, delivered from program performers, into comprehensive and usable versions, and c) to make regular modifications and revisions, as determined by the program for periodic DARPA releases, and d) provide version control, and support to the user community.

The integrator must take the lead role in working with the program performer community to define architecture for Bio-SPICE development, as well as definition of database structure, within 6 months from the date of contract completion. The integrator must have strong interdisciplinary technical expertise to effectively interact with program performers, and expert panels for model and software evaluations. The integrator must implement revised integrated releases of Bio-SPICE. Releases are expected to occur one to two times a year, with an initial baseline version in the first year. Integrator must work with a developer and user community that extends to performers from other Governmental agency programs as determined by DARPA. It is also desired that the integrator be willing to execute, on behalf of DARPA, any software licenses that arise in the development of Bio-SPICE.

Proposals on integration should outline potential architectures for Bio-SPICE development, and associated architecture for databases needed for standardized data and models. Proposals should analyze the benefits and limitations of the alternatives. Proposers should also establish in their proposal clear commitment to open source software development for the duration of the program (anticipated to be five years). This may include evidence of prior successful accomplishment in such an activity, and/or letters of commitment from the proposer organization. Integration team led by universities and/or non-profit agencies are encouraged.

Open Source Bio-SPICE Development and Licensing: The licensing is intended to support development of high quality techniques and tools, allowing provisions for linking with proprietary software for commercialization. All software developed as a part of the program will be open, in the sense that program performers and other DARPA authorized users will have the right to view, use, modify, and distribute code within the program authorized community. All derived works including revision, enhancement, modification, translation, abridgement and expansion of code will also remain open in this sense. Official releases of Bio-SPICE may be combined with other substantially different proprietary software and data, with a clear delineation of the boundary between open and proprietary software, and used for commercial purposes. The DARPA Director reserves the right to approve and exercise licensing arrangements depending on the context and the relevance to national security.

PROGRAM SCOPE

DARPA anticipates the Bio-Comp program to be five years in duration. Proposals for all areas and topics, except the integration task, should have duration of no more than 36 months of base funding, and may include additional one or two year options. Proposals on integration can range from 36 to 60 months, with options; however, the total duration cannot exceed 60 months. Cost sharing, as well as sharing of data and other relevant intellectual property, is encouraged. Proposals may involve other research groups or industrial cooperation. A proposal may address one or both the areas of DNA computing, and computational models and simulation of intra-cellular processes and systems. Multiple awards are expected in the DNA computing area. Regarding the latter area, refer to Section II of this PIP for information on number of awards and teaming desirability.

Proposed research should investigate innovative approaches and techniques that lead to or enable revolutionary advances in the state-of-the-art. Proposals are not limited to the specific strategies listed above, and alternative visions will be considered. However, proposals should be for research that substantially contributes towards the goals stated. Research should result in prototype hardware and/or software demonstrating integrated concepts and approaches. Specifically excluded is research that primarily results in evolutionary improvement to the

existing state of practice or focuses on a specific system or solution. Integrated solution sets embodying significant technological advances are strongly encouraged over narrowly defined research endeavors.

PROPOSER INFORMATION AND TEAM FORMING MEETING

DARPA will hold a proposer information meeting on Bio-Computation. This meeting is also intended to facilitate team forming, in addition to the team forming web site indicated in the next section. This meeting will be held March 1, 2001, at the Greenbelt Marriott Hotel in Greenbelt, MD. Attendance at this meeting is OPTIONAL, but is recommended for potential bidders. Please access the Bio-Comp website for the meeting details including registration. The website can be accessed at:

http://www.dsic-web.net/ito/meetings/biocomp2001feb/index.html

TEAM FORMING WEB SITE

The formation of multi-disciplinary teams consisting of complementary areas of expertise is strongly encouraged. Teams may include experts from any type of organization. An interactive web site has been established at the following URL where capability statements from those seeking team formations can be posted:

http://www.dsic-web.net/ito/solicitations/biocomp/teaming/login.html

The web site will remain active from the date of issuance of this BAA until May 3, 2001. Specific information content, communications, networking, and team formation are the sole responsibilities of the participants. Neither DARPA nor DoD endorses the destination web site or the information and organizations contained therein, nor does DARPA or DoD exercise any responsibility at the destination.

SUBMISSION PROCESS

The Defense Advanced Research Projects Agency/Information Technology Office (DARPA/ITO) requires completion of a **Broad Agency Announcement (BAA) Cover Sheet Submission** for each Proposal, by accessing the URL below:

http://www.dyncorp-is.com/BAA/index.asp?BAAid=01-26

After finalizing the **BAA Cover Sheet Submission**, the proposer must submit the **BAA Confirmation Sheet** that will automatically appear on the web page. Each proposer is responsible for printing the BAA Confirmation Sheet and submitting it attached to the "original"

and each designated number of copies. The Confirmation Sheet should be the first page of your Proposal. Failure to comply with these submission procedures may result in the submission not being evaluated.

Revised!

Proposers are strongly encouraged to submit a proposal abstract in advance of actual proposals. This procedure is intended to minimize unnecessary effort in proposal preparation and review. An original and **4** copies of the full proposal abstract, and **6** electronic copies (i.e., **6** separate disks) of the abstract (in Microsoft Word '97 for IBM-compatible, **PDF, Postscript, or** ASCII format on one 3.5-inch floppy disk or one 100 MB Iomega Zip disk). Each disk must be clearly labeled with BAA 01-26, proposer organization, proposal abstract title (short title recommended) and Copy ___ of **6**. The full proposal abstract (original and designated number of hard and electronic copies) must be submitted to DARPA/ITO, ATTN: BAA 01-26, 3701 N. Fairfax Drive, Arlington, VA 22203-1714, in time to reach DARPA by 4:00 PM (ET) **Thursday, March 22, 2001**, in order to be considered.

Revised!

An original and **4** copies of the full proposal, and **10** electronic copies (i.e., **10** separate disks) of the full proposal (in Microsoft Word '97 for IBM-compatible, **PDF, Postscript, or** ASCII format on one 3.5-inch floppy disk or one 100 MB Iomega Zip disk). Each disk must be clearly labeled with BAA 01-26, proposer organization, proposal title (short title recommended) and Copy ___ of **10**. The full proposal (original and designated number of hard and electronic copies) must be submitted to the administrative address for this BAA in time to reach DARPA by 4:00 PM (ET) **Thursday, May 3, 2001**, in order to be considered. DARPA will acknowledge receipt of submissions and assign control numbers that should be used in all further correspondence regarding proposals.

DARPA will attempt to review proposal abstracts within 30 days after receipt, and will make a recommendation encouraging or discouraging formal proposal submissions. Proposal abstracts will be reviewed as they are received. Early submissions are strongly encouraged. Regardless of the recommendation, the decision to propose is the responsibility of the proposer. All submitted proposals will be fully reviewed, regardless of the disposition of the proposal abstract.

The typical proposal should express a consolidated effort in support of one or more technical topic areas. Disjointed efforts should not be included in a single proposal.

Restrictive notices notwithstanding: Proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate non-disclosure requirements.

EVALUATION AND FUNDING PROCESSES

Proposals will not be evaluated against each other, since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in PROPOSAL FORMAT Section I and Section II (see below). Other supporting or background materials submitted with the

proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Evaluation of proposals will be accomplished through a scientific review of each proposal using the following criteria, which are listed in descending order of relative importance:

(1) Overall Scientific and Technical Merit: The overall scientific and technical merit must be clearly identifiable. The technical concept should be clearly defined and developed. Emphasis should be placed on the technical value of the development and experimentation approach.

(2) Innovative Technical Solution to the Problem: Proposed efforts should apply new or existing technology in a new way such as is advantageous to the objectives. The plan on how offeror intends to get developed technology and information to the user community should be considered.

(3) Potential Contribution and Relevance to DARPA Mission: The offeror must clearly address how the proposed effort will meet the goals of the undertaking. The relevance is further indicated by the offeror's understanding of the operating environment of the capability to be developed.

(4) Offeror's Capabilities and Related Experience: The qualifications, capabilities, and demonstrated achievements of the proposed principals and other key personnel for the primary and subcontractor organizations must be clearly shown.

(5) Plans and Capability to Accomplish Technology Transition: The offeror should provide a clear explanation of how the technologies to be developed could be be transitioned to capabilities for DOD and the military forces. Technology transition should be a major consideration in the design of experiments, particularly considering the potential for involving potential transition organizations in the experimentation process.

(6) Cost Realism: The overall estimated cost to accomplish the effort should be clearly shown as well as the substantiation of the costs for the technical complexity described. Evaluation will consider the value to Government of the research and the extent to which the proposed management plan will effectively allocate resources to achieve the capabilities proposed.

Proposals may be reviewed by non-government personnel; however, contractors will not be used to conduct evaluations or analyses of any aspect of a proposal submitted under this BAA, unless one of the three conditions identified in FAR 37.203(d) applies.

As soon as the proposal evaluation is completed, the proposer will be notified of selectability or non-selectability. Selectable proposals will be considered for funding; non-selectable proposals will be destroyed. (Copies of non-selectable proposals may be retained for filing purposes.) Not all proposals deemed selectable will be funded. Decisions to fund selectable proposals will be based on funds available, scientific and technical merit, and potential contribution and relevance to DARPA's mission and offeror's capabilities and expertise. In addition, proposal funding

decisions may be based on research efforts most relevant to program goals. DARPA may retain some selectable proposals for a period of up to one year, in order to reconsider those proposals for funding. Submitters of those retained proposals will receive notification to that effect.

The Government reserves the right to select for award all, some, or none of the proposals received. Proposals identified for funding may result in a contract, grant, cooperative agreement, or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. If warranted, portions of resulting awards may be segregated into pre-priced options.

GENERAL INFORMATION

Revised!

Proposals not meeting the format described in this pamphlet may not be reviewed. Proposals and proposal abstracts **MUST NOT** be submitted by fax **or e-mail**; any so sent will be disregarded. The *Commerce Business Daily* notice, in conjunction with the BAA 01-26 Proposer Information Pamphlet (PIP) and all references, constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or other solicitation regarding this announcement be issued. Requests for same will be disregarded. All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

PROPOSAL ABSTRACT FORMAT

Proposal abstracts are encouraged in advance of full proposals in order to provide potential offerors with a rapid response and to minimize unnecessary effort. The abstract submission should be clearly marked "PROPOSAL ABSTRACT" and should include a cover sheet and a technical section.

Revised!

The cover sheet should include: (1) BAA number; (2) Technical topic area; (3) Proposal title; (4) Technical point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (5) Administrative point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (6) Summary of the costs of the proposed research, including total base cost, estimates of base cost in each year of the effort, estimates of itemized options in each year of the effort, and cost sharing if relevant; and (7) Contractor's type of business, selected from among the following categories: "WOMEN-OWNED LARGE BUSINESS," "OTHER LARGE BUSINESS," "SMALL DISADVANTAGED BUSINESS [*Identify ethnic group from among the following: Asian-Indian American, Asian-Pacific American, Black American, Hispanic American, Native American, or Other*]," "WOMEN-OWNED SMALL BUSINESS," "OTHER SMALL BUSINESS," "HBCU," "MI," "OTHER EDUCATIONAL," "OTHER NONPROFIT", or "FOREIGN CONCERN/ENTITY."

The technical section of the abstract should include the following: A. {1 page} Innovative claims for the proposed research. This page is the centerpiece of the abstract and should succinctly describe the unique proposed contribution; and B. {4 pages} Technical rationale, technical approach and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable products. Include comparison with other ongoing research indicating advantages and disadvantages of the proposed effort.

Revised!

The total length of the abstract should not exceed six pages including the cover sheet. Submissions must be formatted **in Microsoft Word '97 for IBM-compatible, PDF, Postscript, or** ASCII, 72 characters to the line, 60 lines to the page. This is the only format that will be accepted. No formal transmittal letter is required.

PROPOSAL FORMAT

Proposals shall include the following sections, each starting on a new page (where a "page" is 8-1/2 by 11 inches with type not smaller than 12 point) and with text on one side only. The submission of other supporting materials along with the proposal is strongly discouraged. Sections I and II of the proposal shall not exceed 40 pages. Maximum page lengths for each section are shown in braces {} below.

Section I. Administrative

Revised!

{1} Cover Page including: (1) BAA number; (2) Technical topic area; (3) Proposal title; (4) Technical point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (5) Administrative point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (6) Summary of the costs of the proposed research, including total base cost, estimates of base cost in each year of the effort, estimates of itemized options in each year of the effort, and cost sharing if relevant; and (7) Contractor's type of business, selected from among the following categories: "WOMEN-OWNED LARGE BUSINESS," "OTHER LARGE BUSINESS," "SMALL DISADVANTAGED BUSINESS [*Identify ethnic group from among the following: Asian-Indian American, Asian-Pacific American, Black American, Hispanic American, Native American, or Other*]," "WOMEN-OWNED SMALL BUSINESS," "OTHER SMALL BUSINESS," "HBCU," "MI," "OTHER EDUCATIONAL," "OTHER NONPROFIT", or "FOREIGN CONCERN/ENTITY."

Section II. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

A. {1} Innovative claims for the proposed research. This page is the centerpiece of the proposal and should succinctly describe the unique proposed contribution.

B. {1} A "Proposal Roadmap" which shall address the following nine areas that must be addressed in the proposal. For each area, the roadmap will contain a summary

statement (or "sound bite") for that area and identify the page number(s) where the issue is addressed in detail. It is important to make these statements as explicit and informative as possible. The areas are:

1. Main goal of the work .

2. Tangible benefits to end users (i.e., benefits of the capabilities afforded if the proposed technology is successful).

3. Critical technical barriers (i.e., technical limitations that have, in the past, prevented achieving the proposed results).

4. Main elements of the proposed approach.

5. Specific basis for confidence that the proposed approach will overcome the technical barriers. ("We have a good team and good technology" is not a useful statement.)

6. Nature of expected results (unique/novel/critical capabilities to result from this effort, and form in which they will be defined).

7. The risk if the work is not done.

8. Criteria for evaluating progress and capabilities.

9. Cost of the proposed effort for each contract year.

C. {17} Technical rationale, technical approach and constructive plan for accomplishment of technical goals in support of innovative claims and deliverables.

D. {2} Deliverables associated with the proposed research. Include in this section all proprietary claims to results, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are no proprietary claims, this should be stated. The offeror must submit a separate list of all technical data or computer software that will be furnished to the Government with other than unlimited rights (see DFARS 227.)

E. {3} Statement of Work (SOW) written in plain English, outlining the scope of the effort and citing specific tasks to be performed and specific contractor requirements.

F. {1} A graphic illustration of the milestones and schedule, including but not limited to, a multi-phase development plan which demonstrates a clear understanding of the proposed research; and a plan for periodic and increasingly robust experiments over the project life that will show applicability to the overall program concept.

G. {2} Technology Transfer. Description of the transferable technology and expected technology transfer path.

H. {3} Comparison with other ongoing research indicating advantages and disadvantages of the proposed effort.

I. {2} List of key personnel, concise summary of their qualifications, and discussion of proposer's previous accomplishments and work in this or closely related research areas. Indicate the level of effort to be expended by each person during each contract year and other (current and proposed) major sources of support for them and/or commitments of their efforts. DARPA expects all key personnel associated with a proposal to make substantial time commitment to the proposed activity.

J. {1} Description of the facilities that would be used for the proposed effort. If any portion of the research is predicated upon the use of Government Owned Resources of any type, the offeror shall specifically identify the property or other resource required, the date the property or resource is required, the duration of the requirement, the source from which the resource is required, if known, and the impact on the research if the resource cannot be provided. If no Government Furnished Property is required for conduct of the proposed research, the proposal shall so state.

K. {1} Experimentation and Integration Plans. Offerors shall describe how their results could be integrated with solutions that other contractors are currently developing or are likely to develop. In addition, offerors should identify experiments to test the hypotheses of their approaches and be willing to work with other contractors in order to develop joint experiments in a common testbed environment. Offerors should expect to participate in teams and workshops to provide specific technical background information to DARPA, attend semi-annual Principal Investigator (PI) meetings, and participate in numerous other coordination meetings via teleconference or Video Teleconference (VTC). Funding to support these various group experimentation efforts should be included in technology project bids.

L. {5} Cost by task, with breakdown into accounting categories and equipment for the entire contract and for each contract year. Where the effort consists of multiple portions that could reasonably be partitioned for purposes of funding, these should be identified as contract options with separate cost estimates for each. Details of any cost sharing should also be included.

M. Contractors requiring the purchase of information technology resources as Government Furnished Equipment (GFE) MUST attach to the submitted proposals the following information:

1. A letter on Corporate letterhead signed by a senior corporate official and addressed to **Dr. Sri Kumar,** DARPA/ITO, stating that you either can not or will not provide the information technology (IT) resources necessary to conduct the said research.

2. An explanation of the method of competitive acquisition or a sole source justification, as appropriate, for each IT resource item.

3. If the resource is leased, a lease purchase analysis clearly showing the reason for the lease decision.

4. The cost for each IT resource item.

IMPORTANT NOTE: IF THE CONTRACTOR DOES NOT COMPLY WITH THE ABOVE STATED REQUIREMENTS, THE PROPOSAL MAYBE RETURNED..

Awards made under this BAA may be subject to the provisions of the Federal Acquisition Regulation (FAR) Subpart 9.5, Organizational Conflict of Interest. All affirmations must state which office(s) the offeror supports, and identify the prime contract number. Affirmations should be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest, as that term is defined in FAR 9.501, must be disclosed in Section II., H of the proposal, organized by task and year. This disclosure shall include a description of the action the Contractor has taken, or proposes to take, to avoid, neutralize, or mitigate such conflict.

Section III. Additional Information

A bibliography of relevant technical papers and research notes (published and unpublished) that document the technical ideas, upon which the proposal is based, may be included in the proposal submission. Provide one set for the original full proposal and one set for each of the **4** full proposal hard copies. Please note: The materials described in this section, and submitted with the proposal, will be considered for the reviewer's convenience only and not considered as part of the proposal for evaluation purposes.

The administrative addresses for this BAA are:

Fax: 703-522-7161 Addressed to: DARPA/ITO, BAA 01-26
Electronic Mail: baa01-26@darpa.mil
Electronic File Retrieval: http://www.darpa.mil/ito/Solicitations.html

Mail to: DARPA/ITO
ATTN: BAA 01-26
3701 N. Fairfax Drive
Arlington, VA 22203-1714